

The CHICAGO NATURALIST



Published by

THE CHICAGO ACADEMY
OF SCIENCES

VOL. 9 • NO. 2



AUGUST • 1946

The Chicago Naturalist



Published four times a year by
 THE CHICAGO ACADEMY OF SCIENCES
Lincoln Park - Clark Street and Ogden Avenue
 CHICAGO 14, ILLINOIS

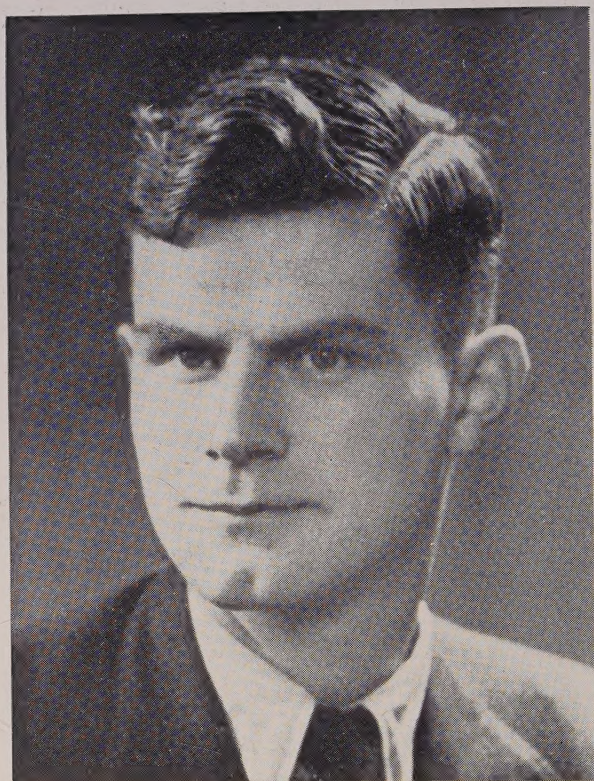
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Jan Joost ter Pelkwyk
1914-1942

Jan Joost ter Pelkwyk, Naturalist

MARGARET MORSE NICE

One afternoon in early May, 1940, a tall young biologist arrived at our home on his round-about way from Holland to Dutch Guiana, where he planned to study the wild life and collect specimens for the University of Leyden for his doctor's thesis. Two days later his country was invaded and all his plans were changed.

The University of Chicago awarded him a Ridgway Fellowship; he was to work out his thesis under Dr. W. C. Allee on a problem connected with the behavior of fishes, thus continuing with studies he had undertaken in Leyden with Dr. N. Tinbergen.¹ For several weeks he stayed with us and



Attitudes of song sparrow in alarm, fear and fright. From left to right (upper row): 1, unalarmed; 2, alert; 3, turning head to look; 4, 5, alarm (wings and tail flipped); 6, strong alarm; 7, fear; 8, fright (panting). Reprinted from *The Auk*, vol. 58.

he and I experimented with my hand-raised song sparrow, showing it a mounted owl and cardboard models of owls and other birds cleverly constructed by Joost (pronounced Yost), who was a skilled artist as well as a keen naturalist with thorough and wide experience. He made sketches of my song sparrow in different attitudes for our articles,^{2,3} and for the book I was working on, as well as sketches of a number of European birds for papers I was writing. For the journal *Bird-Banding*, he wrote an article on the ancient art

¹ Eine reizbiologische Analyse einiger Verhaltensweisen von *Gasterosteus aculeatus* L. 1937. *Z. f. Tierpsych.*, 1 (3): 193-200.

² 'Anting' by the Song Sparrow. 1940. *Auk*, 57: 520-522.

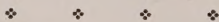
³ Enemy Recognition by the Song Sparrow. 1941. *Auk*, 58: 195-214.

of "Fowling in Holland,"⁴ and also reviews of Dutch and German papers on bird behavior. His boundless enthusiasm for all aspects of nature made him the best of companions on field trips; he loved the flowers on the unbroken prairie and when we showed him a scarlet tanager, he exclaimed, "That is the most splendid bird I have seen in America."

During the summer he lived at International House where he served as librarian ("very pleasant kind of work") and had a "regular disciple to teach German"; he took courses with Dr. Carl Moore and Dr. Alfred Emerson, writing for the latter a paper on "Sex Pairs of Fishes as Coöperative Units" that contains a vast amount of information.

In the fall the Netherlands Government appointed Joost ichthyologist at the Fishery Research Station in Batavia. On the way to Java he visited Yellowstone Park and several government fishery stations on the West Coast; with David Nichols he took a Christmas census in Nevada where he found "the cactus desert perfectly exciting." It was with great regret that he left "this dear country," and he often wrote of his intention of returning. In Java, while one biologist experimented on improved methods of salting fish, Joost's task was to find new fishing grounds and new methods of capture. This work involved traveling to many islands where he saw "daily the most amazing new creatures and the most fascinating scenery."

In the summer of 1941 he received some naval training, but returned once more to fishery problems. When war enveloped the Indies we heard no word of him. "We always imagined Joost living on some forgotten island," his sister wrote. In the spring of 1946 we at last learned his fate. On March 1, 1942, a small motorboat left Batavia for Australia with a staff of officers, and Joost of his own free will accompanied them as one of the sailors. Early the next morning they ran into a group of Japanese boats that immediately started shooting. Joost was one of the first to be killed.



At my request, Mr. G.A.W. ter Pelkwyk, Bourgomeister of Utrecht, wrote me something of the childhood and youth of his son. Joost was born at the Hague October 24, 1914; he was a sturdy boy, but his years at school were difficult ones. With his independence and his passion for the outdoors, the dry subjects of the school curriculum made little appeal to him. "The love for traveling he possessed already as a young boy. He came to know early all the beautiful spots of his country which he searched for animals, plants and mussels. His bedroom was his laboratory. The difficulties this caused in his home may be imagined." (His mother wrote me, "I remember that

⁴Jan. 1941, 12: 1-8. With 5 sketches.

once I was very happy when the smell in his room was too bad for himself.") "One of his favorite tours was to the peninsula 'de Beer,' a nature monument at the mouth of the River Maas, opposite Hook of Holland, a place rich in plants and birds. To reach this place he crossed the river in a canoe in any kind of weather. He knew no danger. In the dunes he discovered pottery fragments and coins from the Romans, which he took to the School Museum at the Hague."

In 1933 he went to Greenland, the journey a reward from his father for passing the entrance examinations for the University; here he visited Dr. N. Tinbergen and made sketches for the latter's "Behavior of the Snow Bunting in Spring."⁵ "That journey was a glorious one for him. He visited Iceland and its geysers, lived in Greenland among the Eskimos, made long trips across glaciers and learned to move about on sea in a kayak."

"During his years at Leyden [where he became assistant to Dr. Tinbergen] Joost worked hard and travelled much. With slight means he went off alone or joined excursions. His own country he got to know extremely well. He travelled in Germany, England, Denmark, Norway and Sweden, in Switzerland, Spain, Italy, North Africa and the Balkans. From all these journeys he brought home drawings, and sketches and he sent articles on his experiences to magazines and professional papers.

"Disguised as a seal he more closely studied the life of these animals. Long hours he spent hidden in a shelter to observe the life of birds. Whenever a whale or a big fish had been cast on the shore, he immediately went there and the most disgusting smell could not frighten him from dissecting these animals. . . . Jan Joost had his friends amongst fishermen, farmers and hunters. He was known to all circles of friends of nature and was a popular leader of excursions of members of the Netherlands Youth Corporation for Nature Study."

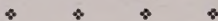
Because of his interest in fisheries he received a special commission, which was thus described by his friend, Luuk Tinbergen:

"Since its enclosure in 1932 the shallow Zuyderzee, formerly a brackish inland sea, soon became a freshwater lake. The marine fishes (herring, flounder, shrimp, etc.) disappeared within a few years. For the eel, however, (which always had inhabited the Zuyderzee) environmental conditions improved, but the future supply was endangered because the larvae could no longer enter upon their arrival from the Atlantic. Pelk was asked by the 'Service of the Zuyderzee Works' to solve the difficulty. He found that the eels, once they arrived in coastal waters, are directed by a positive rheotaxis, which is released by a decrease in the salinity of the water and by darkness, and that the larvae are capable of swimming only against rather weak currents. He planned a system by which the eels were first attracted by fresh leak water currents from the closed 'great sluices' (i. e., those sluices which are not used for the passage of ships, but only for draining off the enormous amounts

⁵Trans. Linnaean Soc. N. Y., 1939, 5: 1-95.

of superfluous water). Subsequently when a great number of eels is concentrated before these sluices, the larvae are locked through as if they were ships in a lock. This system proved successful, enormous numbers being lured into the Zuyderzee with very little trouble, and it is still in use."

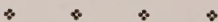
Joost's father wrote of his interest in photography, modeling and drawing; with some difficulty he persuaded him to take lessons from Dirk van Gelder and a warm friendship arose between teacher and pupil. "Van Gelder saw Joost as a person of lively talent and a fierce, almost poetical interest, with a passion for drawing, which is that of the artist and which one rarely finds with young people."



Dr. Allee wrote to Joost's mother: "He was one of the most promising of the many excellent young people who have been associated with me. He was an interesting combination of maturity in judgement, outlook and ability combined with his full share of youthful enthusiasm. . . . I admired your son, appreciated his abilities and personality and am sorrowed by this final news of his death."

In "Birds Across the Sky"⁶ Florence Jacques writes of him: "I never have seen a youth so absorbed by nature and so brilliantly informed in all its aspects. He lived for natural history."

What I remember best about him is his eagerness, his friendliness, his keen awareness of nature, his passionate love for the "gallant glory of the world." His welcome to a baby of his friends, named for him, well represents his own attitude, "I hope he will learn to love this world, which is large and good and which shelters immense values in every little corner."



Joost's letters from the East Indies gave vivid descriptions of what he saw. I will give quotations from them, as he wrote them. "English spelling is still witchery to me, as is sometimes grammar," he once informed me.

On April 16, 1941, he wrote his family from Batavia:

"In spite of everything we are and we will stay optimistic here. Whatever happens, I will be grateful that I have had an opportunity to see so much of this beautiful world. Moreover it gives me satisfaction to know that I am doing my duty . . . The happy life of the fisherman and the fascinating sailing business—the world I spend my time at now—are still more a fairy tale to me than a reality. So you see, I have a very good time indeed. The idea is that practically all of my work will be more or less purely scientific. This is fine, for then I will keep a way open for further work."

⁶1942. p. 122. Harpers.

On the same day he wrote me explaining something of his work:

"Some of the most important food fishes are—although they may spawn all the year round—decidedly migratory in their habits. We hope to be able to predict their migrations and to direct the fisherman to the spots where concentrations may be expected. You see that is quite a fascinating problem! It is almost too much for one man. We have a great deal of help from native 'white collar workers' people with high school education who do very well all kinds of simple jobs. So our work becomes more the art of organising the office than doing everything yourself—as I used to do. I come very often in 'the field,' made grand trips on Java and along the west coast of Borneo and to most of the islands in the Java sea.

"You will be surprised to hear that there are fishes here with 'Territorial Songs' they really sing, though it does not sound very pleasing to our ears. . . . Lovely are the flocks of noisy paraquits. In Borneo I have seen on the same day Proboscis monkeys and Rhinoceros birds. Smaller monkeys are quite common and of course, I love them! Everywhere in the rice-fields of Java you may see hundreds of herons, night herons, egrets and small passerines.

"By the way two days ago I did an observation you will be interested at. In a tree in the garden a terrific noise made me curious; 45 sparrows (*Passer montanus malaccensis*), two or three orioles (*Oriolus chinensis*) and 15 rice birds (*Padda oryzivora*) made alarm notes in chorus. I expected to see an owl in the tree so I looked and looked with my glasses but did not see a thing. I just had stated that they might be crazy or something as I observed one of the 'branches' of the tree moving slowly. It was a small *Python reticulatus* that had caused so much excitement! Some native boys went into the tree to kill the harmless snake; they disturbed a nest of wild bees; were bitten and ran away, the hive following them with great ferocity. The birds had gone during all this excitement and the snake remained for the rest of the morning unobserved."

On April 26 he sent a charming letter, illustrated with sketches,

"To my bird-friends, New York:

"Dear Friends!

"Would you like to go birding here? OK, take a bicycle and come along. A bicycle is here the best means of transportation and like everywhere the early morning is the best time for birding. Then the temperature is very pleasant too. We leave at half past five or quarter to six. My one-room house is in the garden city of Batavia. Batavia, a half-million city, is rather large and has the most unusual shape being nearly ten times as long as broad. Wherever you live, you are always relatively near to the fields. The city offers a great variety of 'Habitat' for human beings—and birds. The roads in the neighborhood are excellent for bicycles, except after a shower, which comes nearly every afternoon. But then we will be home again. In the tops of the trees, as silhouets against the clear sky, small thrushlike birds are singing in chorus. These are golden-vented bulbuls (*Pycnonotus aurigaster*). They sing more or less like robins, and live everywhere near human dwellings. An other 'city bird' is the gray-backed shrike (*Lanius shach*) very much like the California shrike, but with a nice orange colored breast and very tame indeed. On a lawn in front of one of the larger houses, six or eight starlings are walking, pecking industriously in the



Golden-vented Bulbul grass. These rose-colored starlings (*Sturnogaster contra*) are perhaps one of the most popular cage birds, kept by the native population. Keeping of cage birds is an ancient tradition and no bird-protecting law has the power to deprive the people of their hobby. However the starlings are plentyfull and tame notwithstanding many are

caught and sold. The other, may be still more popular cage bird is a little dove (*Geopelia striata*). Nearly every native home has its 'perquutut' in a dome shaped cage sometimes attached to a long pole to give the little favorite a maximum of fresh air. A small woodpecker is making a terrific machinegun-noise in top of an antenna (*Dryobates analis*).



Rose-colored Starling

"We are in the fields just after dawn. The air is clear and bluish green in color. Far away you see clearly the outline of two big volcanoes. In front, flooded rice fields. Early in the morning those fields remind to ancient church windows. All shades of colours from the rising sun are reflected in the sepearate parts of water, bordered by irregular narrow strips of black dikes, forming an interesting pattern over the scenery. In the water with its regular dots of bright green riceplants, hundreds of herons are fishing. During the flooded period the fields yield an additional crop of fish, but certainly not every little fish planted out will be found back afterwards! There are many different herons on Java and they are all rather common too. On a single trip you may see the great blue and purple herons, three egrets, night herons, bittern, and two little 'pond herons' (*Ardeola*). It is a marvelous view to see a big heronny in a huge Ficus-tree on the middle of the market place in a native village. Of course you may expect some rails in the rice fields. One of the most beautiful birds I know, is the native coot (*Porphyrio albus*). Between the yellowish green of the rice you suddenly see a coot with a bright red bill and deep blue and purple all over.



Perquutut
(*Geopelia striata*)

"Between the fields you see many little 'woods.' Please don't suppose this were tropical jungles! They are but villages with gardens of all kinds of fruit trees. The thing that fascinates me is that these trees look all the time as if it were spring. They don't have the dull green colors of our trees in summer, but look like oaks in early June. Some trees, or branches of trees however look very winter-like indeed. A



Pond Heron



Noisy Paroquet

flight of noisy paroquets (*Psittacula alexandri*) has stripped all the leaves. Many singing golden orioles make me think of my own garden in Holland. It was surprising to find a pale colored edition of the ordinary European coaltit (*Parus major*) here. They look like mounts that have been preserved for halve a century or so in a show, not far from the window. Two other interesting birds are the fan-tailed flycatcher (*Rhipidura albicollis*) and the magpy-colored Straits robin (*Copsychus saularis*), which however is certainly not named after your robin, but after the British one.

"Real jungle may only be found here on the slope of the volcanos. Don't forget that Java is one of the most densely populated spots of the world. Over fifty million people live together in an area of the size of Florida. If you realize that, it is surprising how much is left for a naturalist here. It seems unbelievable that tigers, rhynocrosses, wild bulls and crocodiles can live in such an anthill of human beings. But they do, thanks to the rather well arranged nature protection and (if nothing unforeseen happens) they will be safe for an indefinite period of time. Along the coast however there is a strip of very much jungle like woods; partly flooded woods with trees on stilt-roots, partly a kind of secondary or tertiary jungle, that has a definite value as a producer of fire wood. We might best go there to spend the rest of the morning. We might just as well go to the mountain slopes to see wild orchids and rhinoceros birds, but we can do so a next time.



Rhinoceros Horn-bill

In the coast-woods we are sure to see lots of my favorites: the monkeys and birding is generally easier there. We have got to wade through brooks and swampy thickets. You may feel at home while hearing the rattle of the American kingfisher. However, the noise is produced by *Rhamphalcyon capensis*, the stork-billed kingfisher, who has about the size of the American and the brilliant colors of the European kingfisher. There are many kingfishers here and you see them near every little brook or stream. Some are bigger others are smaller but all have the most brilliant colors and color-patterns. An other bright bird that we will see without doubt is the bee-eater, (not beef-eater, though that is a brightly colored animal too). They are considered to be migrants here though they stay all the year round. But nobody has ever seen them breeding and they will have to reproduce somewhere.

"There are lots of migrants here: in Winter from Asia and in Summer from Australia. The barn swallows are leaving just now for China. All the time you hear the monotonous call of cuckoos. One of them has the disagreeable name of 'brain-fever' because of the sound (and the effect) of its call (*Caccmantis merulinus*). An other cuckoo, crow-pheasant (*Centropus sinensis*) is big and heavy and if he calls, it is, if a drum is beaten. It will not last long before we see the first monkeys. Sometimes you notice them far, far away because of their screaming noises. Often, especially at the middle of the day you observe them suddenly overhead, sitting quietly and making faces at you. They are rather tame and will certainly stay, if you keep quiet. There are two kinds that are by far the most common: a gray one with a very human expression and a slender black one (*Macacus cynomolgus* and *Semnopithecus maurus*). A remarkable creature that is quite common here is the 'dragon', a little lizard that sails through the wood like a glider-plane on the skin, expanded between the ribs. There are many species of them and most have a very nice color. Between the roots of the trees all kinds of little noises are heard, produced by armies of crabs. At the edge of a brook or in the top of a palm tree a group of birds, more or less sparrow-like, is flying about in a very busy manner. It is a colony of weaverbirds. There are three kinds of them here, all with different types of nests, the most remarkable being *Procecla hypoxanta*, a rather common zoo-bird I believe. The bright Java sparrow, the munias and field sparrow are the most common finches. They feed in huge numbers on the ripe rice fields.



Draco

"Between the sea and the land often fish ponds have been laid out. They are more or less like the famous salt pans near Salinas (Monterey), only they are filled with brackish water instead of brine. All kinds of shore birds are to be found there: golden plovers (*Charadrius apricarius*), curlews (*Numenius phaeopus*), snipes (*Capella stenura*) and sandpipers (*Eriola ruficollis*, for instance) make you think of Long Island. In a sandy pool, however, a group of very official Adjutant-birds remind you to the fact that you are birding in the far east. Because of my job, I spend most of my time on or near the Java sea. Now you might think that I will have a fine opportunity for watching birds. It is a great shame that real sea birds are scarce here. Joe Hickey will be disappointed indeed for we don't have any gulls here to give them colored bands. He will have to spend all his time at peregrine falcons, that are only slightly different from the American ones. There are many more 'hawks' here. Exceedingly common everywhere along the coast is a chesnut-colored Brahminy kite. Far from



Macaque



Adjutant-birds

rare is a sea-eagle (*Halicetus leucogaster*), that makes me think of your quarters and half dollars. They come down in the fish-markets to steal fish! But as a whole, the sea is rather desolate. Except for a few terns and one or two frigate birds or boobies, very little distracts my attention from the fishes. I wish that all of you, or at least one of you, will come here in the next future to go with me on a real bird-trip. I hope it will give you as much joy, as birding around New York has given to me.



"Moorish Idol"
(*Zanclus cornutus*)

Sincerely yours,

Pelk."

On May 10 he wrote to me from Batavia, lamenting the lack of a good ornithological library. "Next week we are going to found an Ornithological Club. About 50 people all on the archipeligo have announced their cooperation. May be we even are going to publish a little paper but for time being we will spend most of our time in writing a booklet with field characters of Javanese birds. There is only one, very expensive book made in Japan, that is rather good (Price \$50)."

Anton de Vos, formerly Curator at the Museum of Zoology at Buitenzorg, tells me that the journal was founded; it was called "Irena" and two numbers appeared; the handbook with field characters and Dutch names was prepared, but has not been published.

On Aug. 27 he wrote me:

"About three weeks ago I left naval service; now back in fisheries again. Next Tuesday I will leave for Somabaya. From there by way of Makassar to Manada right near the Philippines in the north of Celebes. Then to the Moluccas and may be to New Guinea. I certainly have an interesting time here; moreover the heat does not yet bother me a thing. Nevertheless the fine letter of Dr. Allee made me a little homesick for quiet and peaceful laboratories where you can do just what is interesting from the viewpoint of biology. I feel very fortunate that you brought me in contact with this wonderful man!

"After mastering some elementary Malay I am tackling now some Chinese too. The Chinese are the great fish-merchants here. It is funny to come in fisheries villages and to find small relicts of ancient China where the trade is concentrated. Chinese certainly is an interesting language. [He gives the characters for wren, goldfish, ornithology, Chicago, Utrecht and mob-psychology.] Everything seems so much more beautiful and picturesque than in our dull western tongues . . . Last week end I observed my first Sacred Ibisses nesting in the middle of an egret and cormorant colony."

It was not until Dec. 16 that he wrote again, this time to Joe Hickey:

"I should have written you long ago but the last few months have been full of tension and of hard work under great pressure. In the clear knowledge that things might become a little upset by this time, we have been extremely busy. I am now ready to leave for the navy as soon as I am called. . . .

"First I went to Manado and the Sangir islands in the north of the island of Celebes. Then to the south (Makassar) and the south east (Boeton) of that island and to a number of small coral-islands in the Flores-sea. On a next trip I went to Bali, Madoera and East Java. You bet it has been interesting! I like the eastern part of the Indies better than the West. The climate has stronger extremes, more rain, longer dry periods, the people are

much more energetic and best of all: the sea is richer in the amount and variety of creatures."

The last letter was written Jan. 22, 1942 from Palembang, Sumatra and sent to his New York friends:

"It is a shame that I did not write more during the past weeks. More than ever before my mind is with you, but I have to tell so much and I get so little chance to sit down and write that it seems a hopeless job to keep up with our correspondence. Since the outbreak of the Pacific war my work is in South Sumatra. You may understand that it is but 1% biology and 99% of every other occupation you possibly can imagine. I often think of those old traders that went out to America to bring fur to Europe. In a rather similar way we gather fish for Java. Because of the vital importance of that smelly stuff I have not yet been called in active service.

"East Sumatra is about just as different from Celebes and Madura where I spent most of the autumn as Florida is from Nevada. It is about the wildest jungle you can think of, a regular 'green hell,' with all the odd attractions of a place that is despised by the majority. The city of Palembang, the plantations and the oilfields are of course very civilized but there I rarely come. Where I spend my time, only fishermen and hunters and rather primitive agriculturists reside. The coast is shallow: mudflats with adjutantbirds and egrets. In the rhizophore woods whitebreasted eagles, fishkites and bee-eaters have their nests. The swampy woods more inland make you think of descriptions of those ancient carboniferous woods. I can't help to look in vain for giant dragonflies and trilobites. You should see those majestic rivers: broad and quiet, very much like the Mississippi river near Dubuque. Those floods around Harrisburg are nothing as compared to the terrific floods here that come back every year in the rainy season, which is at its highest right now! Herons are walking slowly in the deep green swampy meadows on the banks. The water is brown and reflects as a perfect mirror every little detail of the monotonous wooded background. At daytime you hear but the annoying songs of insects and invisible birds. Purple and green kingfishers form a delightful contrast to the green and the brown of trees and water. At night the horrible roar of a crocodile breaks the monotonous song of toads and frogs. Flying foxes make you think of night-herons that have lost their tail. Rather often a big lizard shows its neck and head in front of the boat. Black and gray monkeys laugh at those stupid human creatures that strive day and night to gather food for somebody else. I finally may get my chance for a skin of a tiger. The regeon is very rich in wildlife but elephants, tapirs, tigers and rhinos are not the way bears and bison are in Yellowstone park. Proportionately you see very little. Moreover Jacques' gun got another destination: in the homeguard.

"Every time I come back in civilization I hear the news. The news is not worse than I have expected ever since I decided to go hither and to take it. Still there is much that makes me very sad. I never realized that I loved this country until the war reached its borders. The occupation of the Minahassa was to me, after my wonderful time there, hardly three months ago, about just as horrible as the occupation of our country in Europe. It will be free once, if peace comes. You hardly can imagine how we are looking at you, at the aid America promised. There may be no doubt that America will win in the long run but to us it is most important that it wins in time, before this wonderful country is destroyed. Our native servant is sure that Java, the center of civilisation, will never be hurt. He reasons: as soon as the Japs come with planes, the bombs will go back and destroy the very plane that released them, for Allah will never allow that his garden becomes a ruin. Our servant is a wise man; maybe he is right."

Characins as Aquarium Fishes

F. H. STOYE

Illustrations by courtesy of the John G. Shedd Aquarium, Chicago

The fishes of the family Characidae comprise one of the largest groups of freshwater fishes. Together with the minnows (including the carps, barbs and their allies), the catfishes and the gymnotid eels, they form the great order Ostariophysi, which includes the great majority of the freshwater fishes of the world. The fishes of this series are characterized by the presence of the Weberian apparatus, a modification of the anterior vertebrae which connects the air-bladder with the ear. Most characins have teeth in their jaws and a small, secondary, rayless dorsal fin, the adipose (fat) fin, like that of the trout. In these characters they differ from the minnows and agree with the catfishes. They differ from catfishes in having scales instead of being naked or covered with bony plates, and in lacking barbels ("whiskers").

The Characidae comprise the dominant family of freshwater fishes in South America. They make up one-third of the piscine fauna there and play a prominent role in Africa as well. Approximately one thousand species are known today; over eight hundred inhabit the Americas and the balance occur in Africa. The range of the American species extends from New Mexico and Texas to south of Buenos Aires.

In this vast territory, where competing forms are few, the characins have diverged in an unbelievable degree to meet diverse food, habitat and enemy conditions. They have filled every ecological niche open to them. They range from toothless, mud-eating forms with long intestinal tracts to flesh-eaters with shearing teeth. In shape they vary from long, slender, fusiform fishes to some that are disc-shaped, almost as deep as long and greatly compressed. They have mimicked and paralleled members of the various families of North American freshwater fishes. For example, our minnows are represented by *Astyanax* and its allies, our topminnows by *Nannostomus*, our darters by *Characidium*, our shads by *Potamorhina*, our salmon by *Salminus*, and our mullets by *Prochilodus*.

The characins first known and available to the average aquarist belonged to the subfamily Tetraodoninae, which includes over three hundred species. This gave rise to the use of the common "Tetra" for its members and for those of closely related subfamilies. These fishes resemble the barbs, but can be readily distinguished by the presence of an adipose fin. They are graceful and active little fishes with pronounced schooling habits. Their conformation is fairly deep and laterally compressed. The dorsal and anal fins are large and the pectorals are frequently scythe-shaped. In the males of many species the tips of these fins are moderately to greatly enlarged. The caudal fin is always forked, usually with lobes of equal length.

While the basic color scheme is generally silvery, horizontal bands of black, blue, red and silver, often in combination of two or more colors, are present in practically all species. The caudal, dorsal and anal fins often have black, red or yellow markings. Red markings in the unpaired fins are more pronounced in the males and are usually replaced by yellow ones in the females. Most have a humeral (shoulder) spot; in many there is a dark area over the caudal base, often with colored highlights which correspond to similar ones in the upper iris of the eye. The eyes are large and aid in the capture of living, moving foods which constitute their main diet.

The species of the genera *Tetragonopterus*, *Moenkhausia*, *Astyanax*, *Hemigrammus*, *Pristella* and *Hyphessobrycon* belong to the subfamily Tetragonopterinae, whose most beautifully colored member is the neon



Black Tetra, *Gymnocorymbus ternetzi*

tetra, *Hyphessobrycon innesi*. Few fishes of the closely allied subfamily Cheirodontinae, which are somewhat slimmer in shape, have been imported. The best-known is the bloodfin, *Aphyocharax rubripinnis*.

Comparatively few characins exceed a length of twelve inches, many are less than six inches long, and quite a few less than three. They display a great diversity of shape and color. Most species are quite hardy and peaceful, not sensitive to low temperatures (many withstand 65° F. or less without harm), and not too difficult to feed and breed. Therefore, a great many species of the family Characidae make highly suitable aquarium fishes.

All characins are oviparous. Most of the species drop their small, more or less adhesive eggs indiscriminately among the plants or free in

the water. There are a few exceptions to this orthodox spawning behavior. The fishes of the genera *Nannostomus*, *Poecilobrycon*, *Characidium*, *Pyrrhulina*, *Copeina* and *Crenuchus* spawn either on broad leaves near the surface, among the rootlets of floating plants, in nests on the bottom, or on flat surfaces near the bottom. The males of these species exercise a more or less pronounced parental care by fanning the spawn and guarding the nest. One species, *Copeina arnoldi*, deposits the eggs several inches above the water, in the wild state apparently on the underside of broad leaves. In the aquarium the cover glass or a sheet of glass inserted in the sand and projecting several inches above the water is accepted as a spawning site. The glass should be slanting and have a rough surface facing the water. To reach their goal both parents leap in unison out of the water with fins partly interlocked, affix the eggs



Neon Tetra, *Hyphessobrycon innesi*

and drop back into their element. They repeat this performance about a dozen times until from sixty to one hundred eggs have been deposited. For a period of three days, while the embryos develop, the male moistens the eggs every twenty to thirty minutes by a flip of his tail.

The Glandulocaudinae present another interesting group with distinctive sexual dimorphism and peculiar breeding habits. In the males of *Corynopoma* the fins are greatly enlarged and the opercle is prolonged into a style with a round tab at its end, resembling a miniature peacock feather. The males of *Gephyrocharax* have the three lower caudal rays separate from the rest of the fin and covered by a flat pouch which extends over the lower caudal lobe. In *Glandulocauda* the males have a similar pouch on the upper half of the caudal base. During curious courting activities, which precede the deposition of eggs by one to several

days, the eggs are apparently fertilized or the sperm transferred in some manner, for females which were separated from the males immediately after courtship dropped fertile eggs in the solitude of a separate aquarium.

The flying characins are popularly known as hatchet fishes because their triangular, disc-shaped body, with its sharp, rounded keel, resembles that tool. Their pectoral fins are large, wing-shaped and pointed. These fishes are able to skim over the water with the ventral region and caudal fin submerged. Occasionally they rise entirely out of the water and skip over the surface for a few feet. Some species are plain silvery with one or more narrow, dark, horizontal bands; others have, in addition, the ventral profile margined with a dark line; and at least one, *Carnegiella*



Silver Hatchet Fish, *Thoracocharax stellatus*

strigata, is darker colored with brown bands and oblique, wavy, diffusing stripes on a silvery background.

The characins we have briefly discussed require similar conditions for their successful maintenance and propagation. In keeping with the habits of these active little fishes their aquarium should be roomy, its size depending upon the number and the species it is meant to accommodate. It should have a sunny location. The planting should be fairly dense in the rear with some plants like *Vallisneria*, *Sagittaria* and *Anacharis* interspersed with *Nitella*. The front half of the tank should be free of plants to provide ample swimming space. Then the delicate, translucent colors which many species display will appear to best advantage.

While most characins depend upon living foods in the wild state they are not particular in the aquarium and readily take prepared foods. To keep them in the best condition they should be given regular feedings of daphnia, enchytraeids, chopped earthworms, small pieces of raw fish, beef liver and fish roe.

When kept at temperature of 72° F. or over, they feel comfortable, display their shiny colors and are a source of never-ending pleasure. For breeding, temperatures up to 80° F. or more are necessary. Breeders are best kept in pairs. They require aquaria of five to ten gallons or larger, depending on the species.

With the conclusion of the war and the gradual re-establishment of shipping facilities it can be expected that large shipments of characins will again reach our shores. Before the war our local hatcheries were unable to supply the great demand for exotic aquarium fishes. As most imports originate in South America, the greater percentage of these fishes will consist of characins.

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Museum Activities



New Insect Cases

For many years a part of the Academy's insect collection has been poorly housed in cardboard boxes stored in large wooden cabinets. Eleven new cases of sheet metal with doors which seal tightly by means of a sponge rubber gasket, each holding ten "Cornell-type" drawers, have been constructed this summer and sheet metal has been cut and formed for thirty more to be assembled during the coming months. At present only ten drawers are at hand but others will be procured as soon as funds become available. Rehousing the collection, placing it in a more accessible location, and augmenting the local material will provide facilities for much needed contributions to the study of natural history in the Chicago Area.

Summer Camp Group

The Chicago Park District instituted a day camp for children this year in Lincoln Park. The Fullerton Pavillion, which was a service men's center during the war, was used as camp headquarters. Each week the children came to the Academy for a lecture, illustrated with motion pictures, on some phase of natural history. The Academy has been happy to cooperate with this very worthwhile program for children and hopes that next year it will be able to take a greater part in the program.

Field Work

The Academy's field work in Arizona was resumed this year during the months of May and June by Dr. H. K. Gloyd, director of the museum. He was assisted by W. A. Bevan of the museum staff, Robert G. Dunlap of the Lincoln Park Zoological Gardens, and Richard A. Edgren, Jr., of the Amateur Herpetologists Club of Chicago. The party again made headquarters at the Boyce Thompson Southwestern Arboretum near Superior at the cordial invitation of the director, Frederick Gibson, who made their stay comfortable and pleasant. The objects of the trip were to make additional motion pictures of wild life for the museum's educational program, continue studies on the nocturnal activities of desert reptiles, and collect specimens for systematic and distributional investigations.

Because of an unexpected and distressing amount of car trouble, activities were largely restricted to the vicinity of the arboretum, although transportation for some night collecting on the desert plain north of Florence was furnished by friends at the arboretum and in Superior.

The season was exceedingly dry and the blooming period of the cacti and other desert plants abnormally poor. Temperatures were unusually high, even for June; maxima of 110° and 111° occurring on two successive days. Although a plan to visit the extreme southwestern part of the state in quest of sidewinders and crested lizards had to be abandoned because of transportation difficulties, general results were fairly satisfactory. Approximately two thousand feet of Kodachrome movies and several hundred specimens (chiefly reptiles) were obtained.

Local field work has been carried on during the spring and summer by Thurston I. Wright and Dr. E. C. Williams. Specimens have been collected for replacements

in the systematic exhibit of birds of the Chicago Area, for new exhibits in preparation, and a considerable number of birds, reptiles, amphibians, and insects added to the study collections.

Italian Center of Anglo-Franco-American Studies

The members of the Board of Scientific Governors of the Academy were recently elected to honorary membership in the Italian Center of Anglo-Franco-American Studies. This is an organization, with headquarters in Palermo, Italy, whose aim is the resumption and development of cultural relations between Italy, France, the United States, Great Britain, and their dependencies.

New Sound Projector

The Academy has recently purchased a new Bell and Howell 16 mm. sound motion picture projector. The new equipment replaced that which was purchased several years ago with funds donated by members of the Academy. The old equipment was traded in and gave a substantial saving on the new projector.

At present, the use of sound motion pictures is limited to the Saturday Morning Programs for Young People, and to such special lectures as require a sound projector. We hope to be able to offer sound movies as a part of our educational program for the schools in the near future.

Personnel

Miss Charlotte Kiewitz, well known to friends of the Academy as a member of the office staff since the summer of 1939, was married on July 13 to Mr. George A. Boz. The wedding took place at Saint Benedict's Church, 2215 W. Irving Park Rd., and a reception was held at the Ravenswood Masonic Temple in the evening. After a two-week wedding trip, Mr. and Mrs. Boz re-

turned to Chicago where they will live at 3852 N. Oakley Avenue. Mr. Boz is employed by the International Business Machines Corporation and Mrs. Boz has resumed her duties at the Academy.

W. A. Bevan, assistant in the shop and laboratory since August, 1945, sailed from New York, August 10, on the S. S. Hopeville for Nigeria. He expects to collect specimens in West Africa for various museums and zoological gardens.

Walter T. Stille, Jr., a member of the Amateur Herpetologists Club, has been serving the Academy as a part-time volunteer worker during the summer while attending school at Roosevelt College. He is assisting Dr. Gloyd with the cataloging of amphibians and reptiles.

Publications

Since the last issue of the *Naturalist*, the following have been published:

"A Case of Intraspecific Poisoning in the Great Basin Rattlesnake" by H. K. Gloyd and W. A. Bevan, *Natural History Miscellanea* number 3, pages 1-3, July 20, 1946, price \$0.05.

"Notes on Some Tennessee Salamanders of the Genus *Pseudotriton*" by M. B. Middleton, *Natural History Miscellanea* number 4, pages 1-3, figure 1, July 27, 1946, price \$0.05.

"The Pseudoscorpion Tribe Cheliferini" by C. Clayton Hoff, *Bulletin*, volume 7, number 11, pages 485-490, July 15, 1946, price \$0.15.

"American Species of the Pseudoscorpion Genus *Microbisium* Chamberlin (1930)" by C. Clayton Hoff, *Bulletin*, volume 7, number 12, pages 493-497, July 15, 1946, price \$0.15.

These publications are available, without charge, upon request, for active members of the Academy. Associate members and others may obtain them at the prices indicated.

Affiliated Societies

With the end of the war, interest in the various fields represented by the societies affiliated with the Academy is increasing. Members are returning from service and meetings are being held normally. If you have a special interest in any of these fields, write to the Academy office for further information.

Societies affiliated with the Academy are as follows:

Burnham Astronomical Society

Chicago Entomological Society

Illinois Audubon Society

Marquette Geologists Association

State Microscopical Society of Illinois

In addition, the Amateur Herpetologists Club of Chicago is informally affiliated with the Academy.

Field Zoology at Northwestern University

During the summer, Dr. Eliot C. Williams, Jr., assistant to the director has been assisting Professor Orlando Park in the field instruction of his class in Field Zoology at Northwestern University.

This course is enjoying its first post-war season, after an enforced lapse of four years.

In the years ahead it is hoped that there will be a great increase in the number of students studying field biology, and its more specialized aspects (field botany, field zoology, ecology, limnology and oceanography), since many problems in both basic and applied biology require an intelligent and sympathetic appreciation of field work. This is especially desirable if the problem of conservation of our natural resources is to be solved.

For some years Dr. Park's course has been one of the outstanding field courses. During the summer of 1937 the field group

was joined by Professor John Phillips of South Africa, who had come to the United States on a study of American methods in the teaching of ecology. Last July this course was selected by the American Society of Zoologists, through a committee formed at the request of the U. S. State Department, as one of several courses to be used as models in its educational program.

A trip to the Chicago Academy of Sciences is an integral part of this course, in which the study collections and exhibits are utilized to supplement field and laboratory work.

Test Your Nature Lore

(True or False)

1. Black and white pepper are obtained from different plants.
2. Vanilla extract is made from vanilla grass.
3. A common moss of the South is the gray-green "Old Man's Beard" or Spanish moss.
4. A rose often used in corsages is the gardenia.
5. Root beer gets its flavor from the root bark of the sassafras tree while the flower clusters of the hop are used to flavor beer.
6. The blue violet (*Viola cucullata*) is the state flower of Illinois.
7. The dye used in litmus paper comes from a lichen.
8. A banana, *Musa textilis*, which grows in the Philippine Islands is the source of Manila hemp and Manila paper.
9. The orange, grape, banana, and tomato are true berries.
10. The shamrock is not a clover.

Answers on page 48.

The Naturalist's Book Shelf

HANDBOOK OF LIZARDS

Lizards of the United States and of Canada

By Hobart M. Smith

Comstock Publishing Company, Inc., Ithaca, New York, 1946, xxi, 557 pages, 136 figures, 135 plates, 41 maps, bibliographies, index. Cloth, \$5.75.

Another of the Comstock handbooks for students of natural history, this splendid volume will prove to be of immense value to everyone interested in reptiles. A book on American lizards, summarizing the knowledge now accumulated in many scattered sources and pointing out specific needs for further observations and investigations, has long been needed.

Part I, the introduction, discusses in general terms the zoological position, characteristics, distribution, major groups, fossil history, structure, habitats, life history, habits, folklore, economic importance, captivity, collecting, and preserving; gives brief tributes to some of the foremost students of lizards in America (with portraits); and concludes with a brief but impressive statement of the many opportunities for additional studies. The section on structure goes into many aspects of general morphology and includes a complete glossary of the numerous and somewhat complicated descriptive terms, significant details of which are well illustrated by line drawings in the accounts of genera and species later on.

Part II, the systematic accounts of species, occupies pages 60 to 481, and treats the ten families represented in North America, exclusive of Mexico, in as much detail as a volume of "handbook size" would permit. For the identification of species there is first an illustrated key to families with references to pages on which begin the general accounts of each. There are also keys to genera and keys to species and subspecies, where necessary.

Accounts of species and subspecies are subdivided as follows: range, size, color, scalation, recognition characters, habits, habitats, problems, and references. The illustrations consist of excellent line drawings from various sources and of photographs mostly by Dr. and Mrs. A. H. Wright of Cornell University, whose skill with cameras and long devotion to the photography of living amphibians and reptiles are well known and admired. The photographs are grouped in "plates" showing dorsal and ventral views and other noteworthy features of the animals. Artistic appearance has been sacrificed because of limited space and some of the pictures have suffered by the necessity of "cropping" at odd angles. A few of the reproductions appear "muddy" but for the most part the work of the engraver and printer is good.

The maps, showing the geographic distribution of species and subspecies by various devices of shading and hatching, and a supplementary section, listing forms recorded for each of the states, combine to add materially to the usefulness of the volume for students in all parts of the country.

Unless one had an extreme predilection for animadversion it would be difficult to find fault with this book. Only one feature is annoying to this reviewer. In the preface (p. viii) the author lists his deviations from the nomenclature of the current Stejneger and Barbour check list, but if one wishes to know the reason for the different name or the new combination he must refer to the citations at the close of the account of the species in question, then hunt for the complete reference in one of three bibliographies toward the end of the volume. A lengthy and formal "synonymy" would be out of place in such a book. However, citing the references to the original description and to

the combination currently accepted at the beginning of the account of each species and subspecies would make greater convenience for those interested in the taxonomy involved, and would add relatively little to the size and cost of production of the book.

The publishers are to be commended unstintingly for this excellent addition to a series of handbooks of proven worth. They are especially fortunate in their selection of the author. No one is better qualified than Dr. Smith for a work of this kind. Seventeen years ago, as an undergraduate, he confided to an associate that he wanted more than anything else to do systematic work on reptiles. Of his many investigations in herpetology, lizards have been his paramount interest during these years. In the preparation of this handbook he has smoothed the paths of all who follow.

H. K. Gloyd

THE LIFE HISTORY OF AN AMERICAN NATURALIST

By Francis B. Sumner

The Jaques Cattell Press, Lancaster, Pa., 1945, vii,
298 pages.
Cloth, \$3.00.

A very honest book written by a clear thinker who greatly loved the beauty and wildness of the world. After tracing, painstakingly and objectively, the influence of his heredity and environment through childhood and youth, he tells of his work with fish at marine laboratories in this country and Italy, of an expedition to Egypt, of his contacts with other scientists, and finally of his long years of studying the geographic variations and heredity of the deer mouse—a project that took him on camping trips to many parts of our country.

The concluding chapters have wide interest, very pertinent to problems of our time: Man versus Nature; The 'Vivisection' Bogey; Why is a Mouse; The Philosophy of the Booster; Some Frank Comments on What Many Call Religion; and Reflections on the Real Value of Science. In the first of these he speaks of "the beauty and majesty of

the redwood forests of northwest California" and "the ruthless waste of this great national scenic asset." "What are believed by many to be the most imposing, and are certainly some of the oldest forest trees on this continent are being sacrificed for the short-lived personal gain of individuals who have chanced to acquire a 'legal' title to them. . . . I presume that to vast numbers of people, even now, there is nothing to criticize in a system which allows the chance purchaser of ten thousand acres of woodland to destroy a forest which could not be restored in a millennium" (p. 223).

In regard to the arid Southwest, he writes: "One of the glorious features of the desert landscape is the relative scarcity of that hopelessly unesthetic creature, man. But, even here, he has begun to stream in over a maze of newly constructed automobile roads, and is busy broadcasting ugliness where once was beauty. . . . It is largely my concern over the rapid effacement of our heritage of natural beauty which has been responsible for my interest in two movements of the day, those of conservation and of birth control. . . . The conservation which chiefly arouses my interest is the move to arrest, so far as possible, the despoliation of our landscape and the extermination of our native species of plants and animals. Similarly, the aspect of birth control which appeals to me most is the desperate need of checking the multiplication of the human species before it fills every nook and cranny of the world which can be made habitable. I agree most fervently with those who believe that the world as a whole is already greatly over-populated, and that important areas in our own country are far too densely crowded for their inhabitants to enjoy normal lives" (p. 223-4).

One would like to go on and on quoting his illuminating comments on the trends of our civilization. Dr. Sumner saw clearly the folly and evil of our exploitation of this once beautiful world and he pleads eloquently for a "More Serious Effort to Rescue a Few Fragments of Vanishing Nature." I wish

his chapters on Man versus Nature and The Philosophy of the Booster might be reprinted and circulated far and wide, for he has said so well what desperately needed to be said. This autobiography of an eminent zoologist is an intensely interesting and important book; it should be read by all those who love nature and are determined to save a "few fragments" for future generations.

Margaret M. Nice

The STUDY OF PLANTS

A Laboratory-Discussion Manual of Botany
By L. H. Tiffany

Harper and Brothers, New York, 1946, vi, 240 pages,
many line drawings, 4 appendices, Looseleaf, \$1.50.

This laboratory-discussion manual contains 37 exercises and includes material for one hundred and fifty class hours of Botany. The loose-leaf style allows opportunity to adapt the instruction to individual needs. In this respect there is flexibility for arrangement to suit a variety of course-studies.

There are commendable features that merit special recognition. The problem approach to the study of plants is the central theme throughout, and it is this approach which makes the learning process interesting as well as stimulating to student and teacher. A group of well chosen illustrations and diagrams eliminates the laborious drawing frequently expected from laboratory work. Photomicrographs are reproduced in places where students can compare diagrams and plant structure as represented in prepared material. Students and instructor find common ground for discussion among the numerous questions and data placed in proper sequence with respect to the exercise.

A day-by-day schedule known to be successful for the study of plants adds to the value of the manual for teachers. Other information carried in the Appendix such as the preparation of classroom material, and lists of reading references increases the effective usefulness of the book.

One might wish for a consistent high quality of lettering such as represented on pages 206 and 207. This technical

detail does not alter the validity of material in those places where lettering could be improved.

As a guide for the teacher and a tool for the student of plant life this laboratory-discussion manual offers splendid possibilities.

O. J. Eigsti

THE NATURE OF THE BEAST

By Ruth Crosby Noble

Doubleday, Doran and Company, New York, 1945,
224 pp., 24 photographs. Cloth, \$2.75

Several months after the death of Dr. G. Kingsley Noble of the American Museum of Natural History, the suggestion was made by Brigadier General Theodore Roosevelt and Roy Chapman Andrews that Mrs. Noble write a popular, informal book on the general subject of animal behavior. The volume under discussion is evidence of her compliance with this timely advice.

The task was lightened by the author's extensive background. This included professional experience derived from an assistant curatorship in the American Museum's Department of Education, a long period of collaboration with her husband in field investigations, an appreciation of the naturalist's point of view as well as the complex environment of a large, metropolitan museum, and at least one joint publication with her husband ("The Anderson tree frog: observations on its habits and life history." *Zoologica*, vol. 2, p. 413-455, 1923).

The materials presented were condensed largely from these varied experiences, lecture notes by Dr. Noble, and published papers by him, his students, and associates.

"The Nature of the Beast" is not a penetrating critique of animal behavior, in which pertinent data are allowed to shed their light impartially upon all aspects of this vast subject. It was not so intended by the author, and, consequently, it would be unjust to review this book from such an academic viewpoint.

As a popular account of the behavior

of animals, it should prove stimulating to the layman interested in why and how many well known animals perform routine tasks. It should serve to bridge the gap between his reactions and those of other animals. It is to be hoped that it will lead him to inquire into the everyday activities and inactivities of other animals in his backyard; to cause him to appreciate more fully the reactions of animals in the local zoological garden; to read further, by means of the small, but carefully selected bibliography of ninety-nine titles, concerning the complex behavior pattern of animals—a pattern in which modern genetics, psychology, physiology and ecology are nicely blended into an abstruse interrogation mark.

To the reviewer, there is too little concerning the behavior of invertebrates; too much emphasis on man and animals, rather than man and other animals; not enough on the relation of behavior to evolution, e. g. the interplay of patterns of reactivity between closely related species in relation to the ecological selection of inherited traits. As to the first point, this is a slender volume and justice to all animals could not be done. As to the last point, we know too little about evolution as yet to present a popular yet accurate account of this central biological problem. Even so, there is a short chapter dealing with this subject.

On the other hand, the book fills a long-felt want on the behavior of vertebrates other than the higher primates. There is much here of interest on fishes, amphibians, and reptiles. The three basic drives of food, shelter, and reproduction are dealt with in various parts of the book, with emphasis on the latter. Thus territory, sex recognition, courtship, parenthood, and reproductive hormones are given as much attention as feasible. There is a good chapter upon the play of animals.

The easily read text is further illuminated by twenty-four sharply defined photographs. These latter are arranged on eight plates that depict incidents in

the courtship of the black-crowned night heron; parental care in the chimpanzee; sex recognition in a male snake, a female *Anolis* lizard, a male frog (*Hyla andersoni*); an especially good series of photographs of sex recognition in the flicker under normal and experimental circumstances; courtship in the peacock and the fighting fish (*Betta*); courtship in jewel fish; parental care in lizards, the Canada goose, and zebra; play of young felid cubs, the panda and bears.

Finally, there is an index of eight pages. This indispensable adjunct to good authorship allows one to find, and collate, the numerous, scattered items concerning a given species population or a particular concept.

Orlando Park

LOUIS AGASSIZ AS A TEACHER

Illustrative Extracts on his Method of Instruction with an Introductory Note by Lane Cooper

Comstock Publishing Company, Inc., Ithaca, New York, 1945, xi, 90 pages, 1 half-tone. Cloth, \$1.50.

This interesting little volume is a revision of an edition first issued in 1917. That a professor of English should edit a volume on Agassiz is a great tribute to one of our great teachers of natural history. The methods of instruction which Agassiz introduced to this country have had a profound effect upon all teaching methods and upon teaching of the natural sciences in particular, through the long line of distinguished scholars who had their training with Agassiz.

A brief biography is followed by several examples of Agassiz' teaching methods as told by the pupils themselves. The last portion of the book includes a list of the pupils of Agassiz, which reads like a "Who's Who" of American natural science; an analysis of Agassiz' personality; a few quotations; and two passages from literature for comparison with the methods of teaching which Agassiz introduced.

This is a book of particular importance for those whose interests lie in the natural sciences, but all teachers would profit from the example set by Louis Agassiz.

Eliot C. Williams, Jr.

Book Notices

TURTOX MICROSCOPY BOOKLET

By A. C. Lonert

General Biological Supply House, Chicago, Ill., 1946,
43 pages, 51 figs. Paper, \$1.00

AMERICAN SPECIES OF AMELANCHIER

By George Neville Jones

The University of Illinois Press, Urbana, Ill., 1946,
126 pages, index, 14 maps, 23 plates. Paper, \$1.50
Cloth, \$2.00

GUIDE TO HIGHER AQUARIUM ANIMALS

By Edward T. Boardman

Cranbrook Institute of Science, Bull. 21, July, 1944,
Bloomfield Hills, Mich., 108 pages, bibliography,
4 appendices, 56 halftones, 3 drawings. Cloth, \$2.00

THE WOLVES OF NORTH AMERICA

By S. P. Young and E. A. Goldman

American Wildlife Institute, Washington, D. C.,
1944, 660 pages, 137 halftones, 10 line drawings.
Cloth, \$6.00

BIRDS OF GEORGIA A Preliminary Check-list and Bibliography.

By Green, Griffin, Odum, Stoddard and
Tomkins.

The University of Georgia Press, Athens, Georgia,
1945, 111 pages, Appendix. Cloth, \$2.00

THE NEARCTIC SPECIES OF TENDIPEDINI

[Diptera, Tendipedidae (=Chirono-
midae)]

By Henry K. Townes, Jr.

The University Press, Notre Dame, Ind., "The
American Midland Naturalist," vol. 34, no. 1,
pages 1-206, July, 1945. Paper, \$1.00

NAME THAT ANIMAL

A Guide to the Identification of the Com-
mon Land and Fresh-water Animals of the
United States, with special reference to the
area east of the Rockies.

By Ernest C. Driver

Kraushar Press, Northampton, Mass., 1942, 527
pages, many drawings. Cloth, \$5.00

Test Your Nature Lore

Answers to questions on page 43.

1. False. *Piper nigrum*, a tropical vine, is the source of both black and white pepper. For black pepper the entire fruit is used, but in most white pepper the black outer covering is removed before grinding.
2. False. Commercial vanilla is extracted from the seed pods of the vanilla orchid, *Vanilla fragrans*.
3. False. Spanish moss, *Tillandsia usneoides*, is not a moss, but a member of the pineapple family.
4. False. The gardenia, *Gardenia jasminoides*, is a member of the coffee family.
5. True.
6. True.
7. True. *Rocella lecanora* is the lichen used.
8. True. After the bananas are produced, the leaves are removed and used in making rope. The strong vascular bundles are separated by hand from the rest of the leaf tissue to secure the fiber.
9. True. Technically, a berry is a many-seeded fruit which is pulpy throughout.
10. False. The lesser hop clover, *Trifolium minus*, is generally regarded as the true shamrock. Other plants which are sold commercially for shamrocks include the white clover, *Trifolium repens*, the bird's-foot clover, *Lotus corniculatus*, and wood sorrel, *Oxalis acetosella*.



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